Adding & Subtracting Rational Expressions

Rule for Adding & Subtracting Rational Expressions:

Let a, b, and c be polynomials where $c \neq 0$.

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$$

Find the sum or difference.

1 $\frac{4}{7x} + \frac{2}{7x} = \frac{6}{7x}$

2 $\frac{5x}{x+3} - \frac{(x+1)}{x+3} = \frac{5x-x-1}{x+3} = \frac{4x-1}{x+3}$

Common Denominator

Least Common Denominator

Find the LCD of the rational expressions.

3 $\frac{2}{3x^3}, \frac{x+1}{12x^2}$ look at number, variable, highest exp.

$12x^3$

4 $\frac{6x}{3x+12}, \frac{x-3}{x+4}$

Factor $3(x+4)$, $(x+4)$ → LCD $3(x+4)$

$3(x+4)$ $(x+4)$

From the Riddle Worsheet:

① $\frac{2}{5x} + \frac{7}{5x} + \frac{3}{5x} = \frac{12}{5x}$

⑤ $\frac{x^2}{3x+15} + \frac{-25}{3x+15} = \frac{x^2-25}{3x+15}$

$\frac{(x+5)(x-5)}{3(x+5)} = \frac{x-5}{3}$

⑨ $\frac{x}{x^2+4x-21} + \frac{7}{x^2+4x-21} = \frac{x+7}{x^2+4x-21}$

$\frac{x+7}{(x+7)(x-3)} = \frac{1}{x-3}$

⑥ $\frac{x^2}{5x+40} + \frac{8x}{5x+40} = \frac{x^2+8x}{5x+40}$

$\frac{x(x+8)}{5(x+8)} = \frac{x}{5}$

5 $\frac{7}{x^2-16}, \frac{x}{x^2-x-12}$

$(x-4)(x+4)$ $(x-4)(x+3)$ $-4 \cdot 3 = -12$, $-4+3=-1$

LCD: $(x-4)(x+4)(x+3)$

Every different factor

6 $\frac{5}{x+1}, \frac{2x}{3x-2}$

LCD: $(x+1)(3x-2)$

Every different factor

Least Common Denominator

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Add/Subtract Rational Exp w/Like Denominators Date_____ Period____

Simplify each expression.

1) $\frac{n-5}{6(5n-4)} - \frac{n-3}{6(5n-4)}$

$\frac{n-5-n+3}{6(5n-4)} = \frac{-2}{6(5n-4)} = \frac{-1}{3(5n-4)}$

2) $\frac{v+5}{9v(v-6)} + \frac{5v+6}{9v(v-6)}$

3) $\frac{n-1}{5(n+5)} \quad \frac{2n}{5(n+5)}$

$\frac{n-1-2n}{5(n+5)} = \frac{-1n-1}{5(n+5)}$

4) $\frac{x-3}{2(x+3)} + \frac{x-5}{2(x+3)}$

5) $\frac{6x}{(x-3)(x+1)} - \frac{4x}{(x-3)(x+1)}$

$\frac{6x-4x}{(x-3)(x+1)} = \frac{2x}{(x-3)(x+1)}$

6) $\frac{n+3}{2n-4} - \frac{5n}{2n-4}$

7) $\frac{2}{n^2-6n+5} - \frac{n+1}{n^2-6n+5}$

$\frac{2-n-1}{n^2-6n+5} = \frac{-1(n-1)}{(n-1)(n-5)} = \frac{-1}{n-5}$

$-5 \cdot -1 = 5$, $-5 + -1 = -6$

8) $\frac{r+5}{18r+36} - \frac{r+1}{18r+36}$

9) $\frac{n-2}{5n+5} + \frac{n-4}{5n+5}$

$\frac{2n-6}{5n+5} = \frac{2(n-3)}{5(n+1)}$

10) $\frac{5}{30x^2-36x} + \frac{x+3}{30x^2-36x}$

Find the Least Common Denominator

11) $\frac{2v}{v-2} - \frac{6}{v+5}$ LCD: $(v-2)(v+5)$

12) $\frac{5}{2(p-2)} + \frac{6p}{3p}$

13) $\frac{6a}{a^2-3a+2} + \frac{4}{5a-5}$

$(a-2)(a-1) \quad 5(a-1)$ LCD: $5(a-1)(a-2)$

Take every different factor

14) $\frac{6v}{v^2-9} - \frac{3v}{2v+6}$

What Unusual Accident Happened to Brainless Flunkalot?

Simplify each expression below. Find your answer and notice the letter next to it. Write this letter in each box containing the number of that exercise.

(1) $\frac{2}{5x} + \frac{7}{5x} + \frac{3}{5x}$

(2) $\frac{4}{2x} - \frac{5}{2x} + \frac{9}{2x}$

(3) $\frac{8x}{x-4} + \frac{3x}{x-4}$

(4) $\frac{x^2}{x-7} - \frac{49}{x-7}$

(5) $\frac{x^2}{3x+15} - \frac{25}{3x+15}$

(6) $\frac{x^2}{5x+40} + \frac{8x}{5x+40}$

(7) $\frac{x+5}{9} + \frac{5x+7}{9}$

(8) $\frac{4x+1}{4x} + \frac{6x-11}{4x}$

(9) $\frac{x}{x^2+4x-21} + \frac{7}{x^2+4x-21}$

(10) $\frac{3x}{x^2-9x+20} - \frac{12}{x^2-9x+20}$

(11) $\frac{x^2}{x^2-4} + \frac{7x-18}{x^2-4}$

(12) $\frac{2x^2-x}{(x-3)^2} - \frac{15}{(x-3)^2}$

(R) $\frac{4}{x}$

(D) $\frac{3(x+2)}{2x}$

(A) $x+7$

(E) $\frac{x-3}{x-5}$

(G) $\frac{12}{5x}$

(K) $\frac{2(x+2)}{3}$

(I) $\frac{11x}{x-4}$

(T) $\frac{2x+5}{x-3}$

(H) $\frac{3}{x-5}$

(U) $\frac{5(x-1)}{2x}$

(C) $\frac{x-5}{3}$

(S) $\frac{x+9}{x+2}$

(M) $\frac{x}{5}$

(N) $\frac{2x-1}{x-3}$

(O) $\frac{1}{x-3}$

4	12	10	9	8	1	10	12	11	12	2	8	5	7	10	3	6

OBJECTIVE 1–a: To add algebraic fractions with like denominators.